(B)

COMMUNITY TECTONICS ARCHITECTS

PSCC EAST
EVALUATION REPORT
November 28, 2011

ARCHITECTURAL EVALUATION REPORT

I. CODE REVIEW

A. See attached codes review for list of items that do not meet the current 2006 IBC and applicable NFPA codes.

II. SITE

1. Existing parking and drives are adequate although there is only one exit from the campus which may restrict traffic flow as the campus becomes fully utilized. Handicapped parking does not comply with current standards. Also many of the walks from the parking lots and into the main building entrance have settled and cracked presenting trip hazards. There are several locations in parking areas and particularly in the loading dock area where pavement is deteriorated and needs to be replaced.

2. Storm drainage is provided in most areas, including the parking areas, however, many of the drains have become clogged and will need to be reopened to provide adequate drainage. The owner may also consider that trees be trimmed to prevent interference with lighting distribution in the parking lots.

3. Fire department access is provided only to the front of the building. In meeting with Capt. Sonny Partin with the City of Knoxville Fire Marshal's office, he has agreed to require a new access drive to be installed only around the pond to the stair doors on the west of the ground floor. This will allow fire department access and also handicapped accessibility to a public way from the lower level of the building. Drive access will not be required by the city to the rear of the building at this time.

4. Adequate fire hydrants do not exist at the site and additional will need to be provided. Refer to the mechanical sections of this report.

III. BUILDING EXTERIOR

1. The majority of the exterior building vertical envelope is in acceptable condition. There are several locations at the building entrance on the main level and outside the lunch room on the lower level where glazing mullions need to be reset and reworked.

2. The existing roof appears to be approaching the end of its useful life and will need to be replaced or refurbished soon.

IV. BUILDING INTERIOR

1. On cursory review the existing building appears to be in reasonably good condition, however, upon more detailed examination there are numerous building and code deficiencies that need to be taken care of before the building should be occupied.

2. Generally upgrades for compliance with ADA requirements are required for egress, toilets and all building components. All hardware will need to be replaced due to these requirements.

3. The two story lobby at the second level is not separated from the remainder of the building. A smoke barrier will be required between this lobby and all other areas.

4. Depending on how the building is subdivided, additional exit stairs will probably be required by the time the building is fully occupied.

5. There are currently no floor to floor fire separations in the building. If separate tenants are considered for this building, fire separations will need to be added both vertically and horizontally. If the building remains one tenant then these separations will not be required although there are a number of individual rooms and areas where fire ratings will be required that are not present, including mechanical shafts.

V. PHASING OF CONSTRUCTION

1. From the funds that are available for the initial improvements to the building it is obvious that the required work will need to be phased. From an architectural perspective, construction would be easier and less expensive if consolidated to specific areas of the building.

2. If improvements are made to specific classrooms along the east-west corridor as originally envisioned by the campus (option 1), substantially more work will be required to bring existing handicapped requirements up to code. All four stairs will require upgrades. All doors along the corridors will need hardware revisions and sometimes replacement. Work will pass through multiple fire alarm and mechanical zones requiring upgrades in each area along the east west axis.

3. If work can be consolidated to core areas or zones (option 2), only two stairs will require upgrades. Only a few corridor doors will require replacement. Mechanical, fire alarm and electrical upgrades can be consolidated only into the primary building areas and not multiple zones of the building.

4. For the reasons stated above, it is the recommendation of this report to focus initial phases of the work into specific areas of the structure and not along the east-west corridor. We believe this will be the most economical approach and allow more useable (and controllable area) to be constructed for the available funds.

VI. SUMMARY

1. The existing facility consists of approximately 221,706 SF of space. Based on our initial investigations and research we would recommend budgeting approximately $75 per square foot to upgrade code, building and services deficiencies and subdivide existing spaces appropriately for use as a community college ($16,627,950). If the building is subdivided into multiple tenant spaces, we would recommend you budget an additional $5 per square foot for the required vertical and horizontal fire separations ($1,108,530). We would also recommend that, if possible this decision be made prior to development of any of the spaces to avoid tear outs or other necessary upgrades to newer areas due to the changed requirements.

2. Because some disproportionate infrastructure costs will be required for the development of a phase one as opposed to the averaged cost of a total development, we would recommend a budget of $100 per square foot for phase one construction.

3. Initially occupied areas (assumed Phase 1) can be accommodated by existing building infrastructure. Major improvements or replacements to the existing utilities will be required before the entire facility can be occupied.

4. Design decisions with regard to building utilities may vary greatly if multiple small phases are anticipated as opposed to those same decisions if only a few larger phases are anticipated for the total building upgrade. Design decisions which represent best practices and lowest costs for multiple phases could result in reduced efficiencies for the overall complex as compared to those that would be made if it is assumed larger areas will be renovated at each phase. Conversely, utility upgrades that are made to accommodate large initial building areas that are initially unoccupied may result in higher initial and operational costs until those areas are put into service. The owner may desire to direct the approach the design team should take with regard to phasing and services.

MECHANICAL EVALUATION REPORT

I. CODE REVIEW

A. See attached codes review for list of items that do not meet the current 2006 IBC and applicable NFPA codes.

II. HVAC SYSTEMS

A. DESCRIPTION OF EXISTING SYSTEMS

1. The existing cooling system for the majority of the building consists of two central chillers with outside cooling towers. The two chillers and towers are each about 400 tons in capacity. One chiller and tower were replaced about 10 years ago with a new York chiller and Marley tower. The other chiller is the original Carrier chiller installed in about 1980 when the building was constructed. The heating is accomplished by electric heaters located above the ceiling around the perimeter of the building. These are sized and controlled to overcome the perimeter skin loss. The cooling for the office areas is provided by four chilled water air units each located in separate mechanical rooms on the third floor. The cool air is routed through spiral supply ductwork down in vertical chases and then above the ceiling to the occupied spaces. The volume of air to the space is controlled by Carrier Moduline VAV boxes. These are regulated by thermostats throughout the building. Box controls are connected by a master and slave arrangement that allows several boxes to be controlled by one thermostat. The controls for the entire building served by the central system are pneumatic. All the air is retumed through a series of ceiling plenums and vertical chases back to the central air units. Each mechanical room is a return plenum.

2. The southwest side of the lower level area where labs, service, and testing were performed has individual single zone chilled water air units hung from the ceiling with metal distribution ductwork. The single story addition on the east side that was built sometime after the original building has two single zone packaged rooftop units with electric heat and distribution ductwork. Some areas such as the human resources area to the left at the main entry has had split system heat pumps added above the ceiling to supplement the original system. Also, special need areas in the lower level such as the central computer server room has individual units specifically designed for this type of use. These are independent of the central system and have indoor units with outside condensers setting on the ground out back. These are no longer usable as the outdoor units have been vandalized.

B. EVALUATION OF EXISTING SYSTEMS

1. The newer York chiller and Marley tower appear to be in reasonable condition and can be reused to serve the building. They were operated this past summer to provide some cooling to the building. The old Carrier chiller and associated tower need to be replaced. The chiller is very inefficient by today's standards and uses a refrigerant which is no longer available except on the secondary market. The remainder of the equipment associated with the central system is beyond its normal expected service life. ASHRAE says the expected service life for this equipment is as follows:

ITEM	ASHRAE EXPECTED LIFE	ACTUAL LIFE TO DATE
Carrier Centrifugal Chiller	23	30
Metal Tower	20	30
Base mounted Pumps	20	30
Pneumatic Controls	20	30
Control Valves	20	30
Centrifugal Fans	25	30
Water Coils	20	30
Carrier Moduline VAV boxes	20	30
Electric Heaters	13	30
Single Zone Package RTU's	15	Approx. 15
Split System Heat Pumps	15	Approx. 15

2. As can be seen from the table above, the majority of the equipment is well beyond its normal expected life of service. The exact date of installation of the package rooftops and the split system heat pumps is not known but is nearing its expected service life.

C. RECOMMENDED CHANGES

1. Due to its age and condition, we recommend that the entire central system except for the York chiller and associated tower be replaced. We recommend that new chilled water VAV air handlers with variable frequency drives and new DDC operated control valves be installed in place of the four existing systems. We recommend that the mechanical rooms for each air unit be expanded if necessary to allow the return to be ducted back to the air unit inside the room and avoid any problems with using the room as a return plenum. The outside air quantity needs to be adjusted to meet current ASHRAE 62.1 standards.

2. The piping system in the central mechanical room needs to be modified to allow the system to operate as a variable flow primary secondary chilled water system. All new pumps should be installed that have variable frequency drives. The control valves should be two way control to allow the flow to be varied in the system to match the building loads and save pump horsepower.

3. The existing main spiral distribution ductwork should be cleaned and modified to be reused. The Carrier Moduline VAV boxes are no longer manufactured and parts for servicing are no longer available. They should be removed and new spiral ductwork installed in there place where required. The perimeter heating system should be removed and a new VAV box system with heat at each box should be designed to meet the new space layouts and zoning needs. An evaluation needs to be performed to determine if it would be cost effective to add a new gas boiler and hot water heating to be connected to the VAV boxes or if the system should remain as an all electric system.

4. The controls should be replaced with a new DDC central control system that can be monitored back at the main campus off Hardin Valley Road.

5. The new chiller system should be sized to allow for the entire building to be served by the central chiller system. As spaces such as the east addition, the lower level spaces not on the central system, and the space to the left of the main entry are renovated, they should be modified to be served by the central chilled water system.

6. The existing York chiller can serve approximately 40% of the entire building. However if a new chiller is not installed in place of the Carrier chiller and the old air unit systems remaining in areas not yet renovated are operated to help control temperature and humidity in unoccupied spaces, a priority control system will have to be installed to limit the use of the existing systems and maintain control over newer occupied spaces.

III. PLUMBING

A. The existing plumbing systems appear to be in good operating condition. No apparent leaks have been observed in our walkthrough of the building. We have operated some of the urinals, lavatories, and water closets and they were operational. Some of the valves may require minor adjustments to obtain the proper flush time. Some toilet areas will have to be modified to meet the current handicap accessibility codes. Water coolers will have to be added to meet codes.

B. The domestic water system has a reduced pressure backflow preventer installed in a hot box located outside the building near the front entry. The box has been sprung or damaged slightly on one end. It has caused a gap between one of the removable panels and the cabinet which will allow infiltration and increase the operation of the heaters. This needs to be repaired. For the most part, where it could be observed the piping insulation appeared to be in satisfactory condition. Only some areas will need to be repaired.

C. The domestic water heating is provided by at least two large electric water heaters with large storage tanks. Although we did not find a date of manufacture, it is apparent that they are not the original heaters installed when the building was constructed. We would recommend that as the renovations take place that smaller tanks be placed closer to the point of use to reduce the amount of storage that is constantly heated and reduce the amount of recirculating piping and heat loss. A final decision will have to be made on this as the layouts and locations of hot water usage is determined.

D. The original drawings show that the sanitary sewer was treated by an on-site treatment plant. However, since this building was constructed, a public sewer has been installed in the area and we have been advised that the building is now connected to the public sewer system.

IV. SPRINKLER/FIRE PROTECTION

A. The building currently has a sprinkler system that was installed at the time of construction. Since there are more than 52,000 square feet on one floor, current codes will require that a second riser be installed and the system divided and the piping mains modified.

B. Apparently adequate water service was not available at the time of construction of the building because the sprinkler system is served by a fire pump and the water source is a pond outside the fire pump building. The fire pump is not served by an emergency generator so there is not a backup electrical service. While the pond appears that it was adequate in size at one time, we cannot be sure how much capacity it still has available. If it is determined that the pond must be re-used, we would recommend that it be drained, cleaned, and any repairs made as required.

C. Currently there are two fire hydrants on the site. Three additional hydrants will have to be added around the building. See the code review section for more information.

D. Since the construction of this building, significant development has taken place on Straw Plains Pike and the water system has been greatly improved. Based on preliminary flow tests available from KUB, it appears that the flow and pressure are adequate to allow the sprinkler system to be converted over to the public water system and the fire pumps abandoned. Further evaluations and hydraulic calculations need to be completed before a final decision can be made. We highly recommend that this be done in order to eliminate the need for maintaining the fire pumps, the pool, and having to add an emergency generator as a backup electrical service for the fire pump.

E. Due to the age of the sprinkler heads, we recommend that new heads be installed in all areas as they are renovated even if the head(s) is not relocated.

V. PHASING OF CONSTRUCTION

A. Since funding for the entire work required is not available at this time, we are assuming that the work will be done in phases. We feel that the best use of the monies from a mechanical standpoint will be to implement option 2 as the first phase. This allows one air unit system to be updated and serve the areas that will be initially used by the campus. The remaining air unit systems can remain as they exist except for code issues and serve to temper the unused spaces to maintain temperature and humidity within an acceptable level but not conditions required for occupancy. In addition to normal requirements and costs for renovation of the spaces for option 2, the following items need to be addressed as a part of phase one.

1. Replace the air unit system that will serve the renovated space in option 2.
2. Central Mechanical Room
    a. Modify piping to provide a primary secondary chilled water system
    b. Replace the primary chilled water pump.
    c. Replace the tower pump
    d. Replace/add a new secondary pump with variable speed drive (provide a backup pump or at least modify the piping for a future backup pump)
    e. A study should be provided to evaluate the use of a gas boiler/hot water heating system versus electric heat in the ductwork/VAV boxes. If hot water heat is decided upon, the initial system should be started in this phase with provisions for expanding as other portions of the building are renovated.

f. A new DDC control system should be installed to control the central plant and be set up to be expanded as additional devices are added to the plant. (Example: a second chiller and tower will be required to replace the old Carrier chiller system in the future as other parts of the building are renovated. This system would also be connected to the air unit controls, etc. for monitoring, reporting trouble alarms, and time of day scheduling.

g. Controls need to be added to the existing air unit systems to monitor temperature and humidity by floor and allow these systems to maintain these spaces within broad limits as long as the chiller system has the capacity available and would still be able to maintain the occupied spaces within design parameters.

ELECTRICAL EVALUATION REPORT

I. CODE REVIEW

A. See attached codes review for list of items that do not meet the current 2006 IBC and applicable NFPA codes.

II. ELECTRICAL SYSTEMS

A. DESCRIPTION AND EVALUATION OF EXISTING SYSTEMS

1. The existing facility is fed by a 4000Amp 277/480V., 3Ph., 4-wire service with step down transformers serving the smaller loads. The existing switchgear, panelboards and transformers are manufactured by ITE (Inverse Time Element) which is no longer in business.

2 The existing lighting through-out the majority of the building is 2'x4' lay-in type fixtures with acrylic lenses and T12 lamps. The main entrance is a two story open area with recessed metal halide downlights and some incandescent track lighting.

3. The existing receptacles located through-out the facility are in good working condition. The majority of power for the open areas are fed thru the furniture.

4. The existing fire alarm system is a combination of 4 separate fire alarm providers (ADT, Mircom, Silent Knight and Fire-Lite Alarms).

5. The existing telephone system and data networking system is in bad condition and will need to be replaced through-out the entire facility to meet PSCC requirements.

B. EVALUATION OF EXISTING SYSTEMS

1. The switchgear and panelboards are in good working condition and do not need to be replaced at this time. The existing transformers have a very loud hum and will need to be replaced or reconditioned if deemed possible by a qualified electrical contractor. The existing panelboards will require to be reworked due to demolition of existing electrical testing equipment that will need to be removed and where areas of the building are renovated.

2. The 2'x4' lay-in type fixtures with acrylic lenses and T12 lamps will need to be replaced with new energy efficient T8 type lighting through-out the entire facility. The main entrance two story open area lighting should also be considered being updated with more efficient lighting.

3. Additional power will be required through-out the facility when renovations begin. Cubicle type furniture connections will need to be disconnected and removed back to the supply source. New power shall be recessed in new walls where required in renovated areas.

4. The existing fire alarm system needs to be replaced with a new addressable type system through-out the entire facility due to condition of the existing system and lack of notification and annunciation devices.

5. The existing site lighting will need to be tested. Replace lamps and/or ballast where required for all exterior lighting fixtures. One shoebox type head is missing on one of the smaller poles lighting the sidewalk near the main entrance and will need to be added. Additional normal power lighting may be needed at all exterior egress doors. Additional emergency egress lighting is required and will need to be added at all exterior emergency egress doors. There are (15) existing ground mounted flood lights that illuminate the exterior face of the building. The owner has the option to re-lamp and re-ballast all fixtures or remove if deem not needed.

III. PHASING OF CONSTRUCTION

1. From an electrical perspective, construction would be easier and less expensive if consolidated to specific areas of the building. This would eliminate having to update additional electrical code issues through-out the remainder of the building.